CLAIMS

Sub A1

1. A method for processing one or more signals in a spread spectrum communication system, the method comprising:

receiving and processing the one or more signals to provide one or more streams of samples; and

first processing the one or more streams of samples to provide a first stream of recovered symbols, wherein the first processing includes

equalizing and combining the one or more streams of samples with an equalizer to generate symbol estimates, and

processing the symbol estimates to provide the first stream of recovered symbols.

2. The method of claim 1, wherein the processing the symbol estimates includes

despreading the symbol estimates with a PN sequence to generate despread symbols, and

decovering the despread symbols to generate the first stream of recovered symbols.

3. The method of claim 2, wherein the despreading and decovering are selectively performed, depending on a data rate of the one or more received signals.

4. The method of claim 1, further comprising:

second processing the one or more streams of samples with one or more rake receivers to provide a second stream of recovered symbols.

5. The method of claim 4, further comprising:

estimating a signal quality associated with each of the first and second processing; and

selecting the first or second processing based on estimated signal qualities associated therewith.

6. The method of claim 5, wherein the signal quality associated with the first processing is estimated based on a mean square error (MSE) between the symbol estimates and expected symbols.

7. The method of claim 6, wherein data rate of the one or more signals is selected based, in part, on the mean square error.

8. The method of claim 1, wherein for the first processing, the equalizing is performed prior to the combining.

9. The method of claim 1, wherein for the first processing, the combining is performed prior to the equalizing.

10. The method of claim 1, further comprising:

first adapting coefficients of each of one or more filters within the equalizer, wherein one filter is operative to filter each of the one or more streams of samples.

11. The method of claim 10, wherein the first adapting is performed for each filter based on filtered samples from the filter.

12. The method of claim 10, wherein the first adapting is performed for the one or more filters based on the symbol estimates.

13. The method of claim 10, wherein the coefficients of each filter are initialized to particular set of values.

14. The method of claim 10, further comprising:

identifying a large multipath of one of the one or more signals being received and processed, and

wherein the first adapting is performed based on a time offset corresponding to the identified large multipath.

15. The method of claim 10, wherein the first adapting attempts to minimize a mean square error between the symbol estimates and expected symbols.

16. The method of claim 10, wherein the first adapting attempts to minimize a mean square error between the filtered samples from the filter and expected symbols.

17. The method of claim 10, further comprising:

slicing the symbol estimates to generate sliced symbol estimates, and

wherein the first adapting is performed using the sliced symbol estimates.

18. The method of claim 10, wherein each filter within the equalizer is implemented as a finite impulse response (FIR) filter.

19. The method of claim 10, wherein the first adapting is performed using time division multiplexed (TDM) pilot reference.

20. The method of claim 10, wherein the first adapting is performed using code division multiplexed (CDM) pilot reference.

21. The method of claim 10, wherein the first adapting is performed using a least mean square (LMS) algorithm.

22. The method of claim 10, wherein the first adapting is performed using a recursive least square (RLS) algorithm.

23. The method of claim 10, wherein the first adapting is performed using a direct matrix inversion (DMI) algorithm.

24. The method of claim 10, wherein the combining is performed based on one or more scaling factors, one scaling factor for each of the one or more streams of samples.

25. The method of claim 24, further comprising:

second adapting the one or more scaling factors prior to the combining.

26. The method of claim 25, further comprising:

identifying a large multipath for each of the one or more signals being received and processed, and

initializing each scaling factor based on a respective identified large multipath.

27. The method of claim 25, wherein the second adapting is performed based on the symbol estimates.

28. The method of claim 1, further comprising:

first adapting coefficients of each of one or more filters within the equalizer, wherein one filter is operative to filter each of the one or more streams of samples; and

second adapting one or more scaling factors used for the combining.

29. The method of claim 28, wherein the first and second adapting are performed separately and sequentially, wherein the first adapting is performed with the one or more scaling factors fixed, and wherein the second adapting is performed with the coefficients for the one or more filters fixed.

30. The method of claim 28, wherein the first and second adapting are performed iteratively a number of times.

31. The method of claim 28, wherein the first and second adapting are performed iteratively over a particular sequence of expected symbols.

32. The method of claim 28, wherein the first and second adapting are performed based on the symbol estimates.

33. A method for processing one or more signals in a communication system, the method comprising:

receiving and processing the one or more signals to provide one or more streams of samples;

first processing the one or more streams of samples to provide a first stream of recovered symbols, wherein the first processing includes

equalizing and combining the one or more streams of samples with an equalizer to generate symbol estimates, and

processing the symbol estimates to provide a first stream of recovered symbols;

second processing the one or more streams of samples with one or more rake receivers to provide a second stream of recovered symbols;

estimating a signal quality associated with each of the first and second processing; and

selecting the first or second processing based on estimated signal qualities associated therewith.

34. The method of claim 33, further comprising:

adapting coefficients of each of one or more filters within the equalizer.

35. The method of claim 34, wherein the coefficients of each filter within the equalizer are initialized using information derived from the one or more rake receivers.

36. The method of claim 34, wherein the coefficients of each filter within the equalizer are adapted using a time division multiplexed (TDM) pilot reference or a code division multiplexed (CDM) pilot reference.

37. The method of claim 34, wherein the coefficients of each filter within the equalizer are adapted using a least mean square (LMS) algorithm, a recursive least square (RLS) algorithm, a direct matrix inversion (DMI) algorithm, or a combination thereof.

38. A receiver unit operative to process one or more signals in a communication system, the receiver unit comprising:

one or more pre-processors operative to receive and process the one or more signals to provide one or more streams of samples;

an equalizer coupled to the one or more pre-processors and operative to receive, combine, and equalize the one or more streams of samples to generate symbol estimates; and

a post processor coupled to the equalizer and operative to receive and process the symbol estimates to provide a first stream of recovered symbols.

39. The receiver unit of claim 38, further comprising:

one or more rake receivers coupled to the one or more pre-processors and operative to receive and process the one or more streams of samples to generate a second stream of recovered symbols.

40. The receiver unit of claim 39, further comprising:

a controller operative to receive estimates of signal quality associated with the first and second streams of recovered symbols, and to select the first or second stream of recovered symbols for subsequent processing based on the received signal quality estimates.

41. The receiver unit of claim 38, wherein the equalizer includes

one or more filters respectively coupled to the one or more pre-processors, each filter operative to receive and filter a respective stream of samples with a set of coefficients to provide corresponding filtered samples, and

a summer coupled to the one or more filters and operative to receive and sum the filtered samples from the one or more filters to provide the symbol estimates.

42. The receiver unit of claim 41, wherein the equalizer further includes a coefficient adjustment element coupled to the one or more filters and operative to adapt one or more sets of coefficients for the one or more filters.

43. The receiver unit of claim 42, wherein the coefficient adjustment element is operative to adapt the set of coefficients for each filter based on the filtered samples received from the filter.

44. The receiver unit of claim 42, wherein the coefficient adjustment element is operative to adapt the one or more sets of coefficients for the one or more filters based on the symbol estimates.

45. The receiver unit of claim 42, wherein the equalizer further includes a slicer coupled to the summer and operative to receive and slice the symbol estimates to generate sliced symbol estimates, and

wherein the coefficient adjustment element is operative to adapt the one or more sets of coefficients for the one or more filters based on the sliced symbol estimates.

46. The receiver unit of claim 42, wherein the coefficient adjustment element is operative to implement an adaptation algorithm selected from the group consisting of least mean square (LMS), recursive least square (RLS), and direct matrix inversion (DMI) algorithms.

47. The receiver unit of claim 41, wherein the equalizer further includes one or more multipliers respectively coupled to the one or more filters, each multiplier operative to receive and multiply the filtered samples with a respective scaling factor to provide scaled samples, and

wherein the summer couples to the one or more multipliers and is operative to receive and sum the scaled samples from the one or more multipliers to provide the symbol estimates.

48. The receiver unit of claim 38, wherein the equalizer includes

one or more multipliers respectively coupled to the one or more pre-processors, each multiplier operative to receive and multiply a respective stream of samples with a respective scaling factor to provide scaled samples,

a summer coupled to the one or more multipliers and operative to receive and sum the scaled samples from the one or more multipliers to provide summed samples, and

a filter coupled to the summer and operative to receive and filter the summed samples with a set of coefficients to provide the symbol estimates.

49. The receiver unit of claim 48, wherein the equalizer further includes

a coefficient adjustment element coupled to the filter and operative to adapt the set of coefficients for the filter based on the symbol estimates.

50. The receiver unit of claim 49, wherein the equalizer further includes

a slicer coupled to the filter and operative to receive and slice the symbol estimates to generate sliced symbol estimates, and

wherein the coefficient adjustment element is operative to adapt the set of coefficients for the filter based on the sliced symbol estimates.

51. The receiver unit of claim 38, wherein the post processor includes

a PN despreader operative to receive and despread the symbol estimates with a PN sequence at a particular time offset to provide despread samples, and

a decover element coupled to the PN despreader and operative to decover the despread samples with one or more channelization codes to provide the first stream of recovered symbols.

52. A receiver unit operative to process one or more signals in a communication system, the receiver unit comprising:

one or more pre-processors operative to receive and process the one or more signals to provide one or more streams of samples;

a first signal processing path comprising

an equalizer coupled to the one or more pre-processors and operative to receive, combine, and equalize the one or more streams of samples to generate symbol estimates, and

a post processor coupled to the equalizer and operative to receive and process the symbol estimates to provide a first stream of recovered symbols;

a second signal processing path comprising one or more rake receivers coupled to the one or more pre-processors and operative to receive and process the one or more streams of samples to generate a second stream of recovered symbols; and

a controller operative to receive estimates of signal quality associated with the first and second signal processing paths, and to select the first or second signal processing path based on the received signal quality estimates.